

Design and Research on Financing Model for Small and Medium-sized Enterprises under the Digital Transformation of Commercial Banks

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Abstract

In the context of the digital economy, as an important part of the national economy, the financing issues of small and medium-sized enterprises have received increasing attention. The digital transformation of commercial banks has provided new opportunities and challenges for the innovation of financing models of small and medium-sized enterprises. This study aims to explore the impact of digital transformation of commercial banks on the financing model of small and medium-sized enterprises, and propose corresponding financing model design solutions. Through literature review, case analysis and other methods, the study found that the application of digital technology in commercial banks can not only optimize traditional business processes and improve customer service levels, but also significantly improve risk management capabilities, and provide more convenient and efficient financing services for small and medium-sized enterprises. Based on this, this paper proposes innovative financing models such as digital credit evaluation system, digital risk management system and supply chain finance based on blockchain technology, and explores its specific implementation path, including internal process transformation of commercial banks, cross-industry cooperation and ecosystem construction, and policy support and regulatory framework optimization. Through the analysis of successful cases at home and abroad, this study summarizes the actual effects and successful experiences of digital transformation on financing of small and medium-sized enterprises, and provides useful reference for policymakers and financial institutions. The research conclusions of this paper show that the digital transformation of commercial banks is not only a necessary way to enhance their own competitiveness, but also an effective means to solve the financing difficulties of small and medium-sized enterprises, which is of great significance to promoting high-quality economic development.

Keywords

Digital Transformation of Commercial Banks; Financing for Small and Medium-sized Enterprises; Digital Credit Assessment; Blockchain Supply Chain Finance.

1. Introduction

1.1. Research Background

With the advent of the digital economy era, the rapid development of information technology and Internet technology is profoundly changing the global economic landscape. The widespread application of digital technology has not only spawned new business models and service models, but also promoted the transformation and upgrading of all walks of life. As an important part of the national economy, the vitality and innovation capabilities of small and medium-sized enterprises are of great significance to economic development. However, small and medium-sized enterprises generally face the problems of difficulty and high cost of

financing, which restricts their development potential. The rise of the digital economy provides a new solution to the financing problems of small and medium-sized enterprises. Through the digital transformation of commercial banks, more efficient and convenient financial services can be provided to small and medium-sized enterprises.

In the wave of digitalization, commercial banks are actively promoting digital transformation, aiming to improve business efficiency, reduce operating costs and optimize customer experience. At present, the digital transformation of commercial banks is mainly reflected in the following aspects: first, the digital transformation of business processes, through big data analysis, artificial intelligence and other technologies, to improve business processing efficiency and accuracy; second, the intelligent upgrade of customer service, through mobile payment, online banking and other methods, to provide customers with 24-hour uninterrupted financial services; third, the comprehensive improvement of risk management, through blockchain technology and smart contracts, to achieve a transparent and credible transaction environment. With the continuous advancement of technology and changes in market demand, the digital transformation of commercial banks will show a more diversified and in-depth trend.

1.2. Research Significance

Exploring the impact of commercial banks' digital transformation on SME financing has important practical significance and theoretical value. First, through the application of digital technology, commercial banks can provide SMEs with more accurate credit assessment and risk management, effectively solve the problem of information asymmetry, improve financing efficiency and reduce financing costs. This not only helps SMEs obtain more convenient financing channels, but also improves their capital operation efficiency, thereby enhancing their market competitiveness. Secondly, this study aims to propose new financing model design ideas, combine cutting-edge technologies such as big data and blockchain, and build a SME financing model that adapts to the needs of the digital economy era. Traditional financing models are usually based on collateral and credit records, while the application of digital technology can conduct a comprehensive assessment of SMEs through data analysis in more dimensions, lower the financing threshold, and enable more high-quality SMEs to obtain financial support. This innovative financing model not only broadens the financing channels for SMEs, but also promotes the optimal allocation of financial resources and promotes the sustainable development of the economy. In addition, the research results will provide an important reference for policy formulation and banking business innovation. By summarizing successful experiences at home and abroad, feasible policy recommendations are put forward to promote the optimization of the financing environment for SMEs. Based on the research conclusions, the government and financial regulatory agencies can formulate more flexible and targeted regulatory policies to encourage commercial banks to actively promote digital transformation and improve the level of financial services. At the same time, commercial banks can learn from the research results, innovate business models, and develop more financial products and services suitable for SMEs, so as to achieve sustainable business development. Finally, this study also has important theoretical significance. In the context of digital economy, the study of SME financing models can enrich the financial theory system and provide theoretical basis and practical experience for subsequent related research. Through in-depth discussion on the application of digital technology in the financial field, it can promote the development of financial technology, promote the innovation of traditional financial theory and practice, and contribute to the construction of a more open, inclusive and efficient financial ecosystem.

1.3. Research Methods

In order to comprehensively and systematically explore the impact of commercial banks' digital transformation on SME financing, this paper adopts a variety of research methods. First,

through the literature research method, the existing research results in related fields are systematically sorted out, and the application status and development trend of digital technology in commercial banks, as well as the main problems and challenges faced by SME financing, are summarized. Secondly, through the case analysis method, representative successful cases at home and abroad are selected to deeply analyze the actual effect of digital transformation on SME financing, and explore its successful experience and innovative model. In addition, through the expert interview method, industry experts are invited to conduct in-depth interviews to obtain first-hand practical experience and professional opinions, providing strong support for the research. Through the comprehensive use of multiple research methods, the scientificity and reliability of the research conclusions are ensured.

2. Literature Review

2.1. Research on Digital Transformation of Commercial Banks

Digital transformation is usually defined as the process by which enterprises optimize business processes, improve customer experience, and enhance innovation capabilities by integrating digital technologies. The digital transformation of commercial banks mainly uses technologies such as big data, artificial intelligence, and blockchain to achieve intelligent and automated business processes. According to research by Gomber et al. (2018), the application of digital technologies in commercial banks not only improves operational efficiency, but also significantly reduces costs. In recent years, the banking industry has launched digital services such as mobile banking, smart investment advisors, and online loans, which have greatly improved customer convenience and satisfaction (Lee & Shin, 2018). For example, China Merchants Bank has achieved intelligent risk control and precision marketing through the application of big data and artificial intelligence technologies, improving customer satisfaction and market competitiveness (Wang, 2019).

In addition, the application of blockchain technology in banking is also deepening. Through its decentralized, tamper-proof and transparent characteristics, blockchain provides new solutions for commercial banks, such as applications in cross-border payments, trade financing and other fields (Chen, 2018). For example, HSBC and Standard Chartered Bank are exploring the use of blockchain technology to simplify trade financing processes, reduce transaction costs and improve transaction transparency (Risius & Spohrer, 2017).

2.2. Research on Financing Issues of Small and Medium Enterprises

Small and medium-sized enterprises play an important role in the national economy, but their financing problems have long been a bottleneck restricting their development. According to Beck and Demirguc-Kunt (2006), small and medium-sized enterprises often find it difficult to obtain loans from traditional financial institutions due to the lack of sufficient collateral and complete financial records. In addition, the traditional financing model relies too much on collateral and credit records, and cannot effectively evaluate the actual operating conditions and development potential of small and medium-sized enterprises, resulting in their financing difficulties (Berger & Udell, 1998).

In recent years, scholars have proposed a variety of new ideas to solve the financing problems of SMEs. For example, Petersen and Rajan (2002) proposed that the use of big data and machine learning technology can more accurately assess the credit risk of SMEs, thereby reducing the problems caused by information asymmetry. In addition, Beck et al. (2008) found that supply chain finance, as a new financing model, can effectively alleviate the financing difficulties of SMEs through the credit support of core enterprises. Especially in China, supply chain finance has become an important way for SMEs to obtain financing, and many commercial banks and Internet financial platforms are actively deploying in this field (Huang, 2018).

2.3. Impact of Digital Transformation on Financing Models

The rapid development of digital technology has brought new opportunities for innovation in SME financing models. Through big data analysis, commercial banks can more comprehensively assess the credit risk of SMEs, thereby reducing the problems caused by information asymmetry (Petersen & Rajan, 2002). For example, Ant Financial provides convenient online financing services for SMEs through its big data risk control system, effectively improving financing efficiency and risk management capabilities (Chen, 2016).

Blockchain technology provides a transparent and secure trading platform, which helps improve financing efficiency and credit guarantee (Catalini & Gans, 2016). For example, the blockchain trade financing platform jointly developed by IBM and Hang Seng Bank realizes automated transaction processes through smart contracts, significantly reducing manual operations and intermediary costs (Risius & Spohrer, 2017). In addition, the application of blockchain technology in supply chain finance has gradually matured, and it can ensure the transparency and reliability of information by real-time recording and tracking every link in the supply chain, thereby improving the security and efficiency of financing (Kouhizadeh & Sarkis, 2018).

There are many successful cases at home and abroad. For example, China's Ant Financial and Tencent WeBank have provided convenient online financing services for small and medium-sized enterprises through big data and blockchain technology, significantly improving their financing environment (Chen, 2016; Wang, 2019). In addition, the US company OnDeck provides fast loan approval and issuance services for small and medium-sized enterprises through its self-developed scoring model, greatly improving financing efficiency (Mills & McCarthy, 2014).

3. Analysis of the Current Status of Digital Transformation of Commercial Banks

3.1. Main Driving Forces of Commercial Banks' Digital Transformation

The main driving forces for the digital transformation of commercial banks include technology, market demand and policy support. Technology is the core driving force of digital transformation. With the rapid development of technologies such as big data, artificial intelligence, blockchain and cloud computing, commercial banks are actively adopting these cutting-edge technologies to optimize business processes, improve customer experience and enhance competitiveness. For example, big data technology can help banks accurately analyze customer behavior and improve the accuracy of credit assessment. Artificial intelligence uses machine learning and natural language processing technologies to achieve intelligent customer service and risk management, and improve service efficiency and quality. Blockchain technology provides a more secure, transparent and efficient solution for cross-border payments and trade financing.

Market demand is also an important force driving digital transformation. As customers' demand for convenient, efficient and personalized financial services continues to increase, banks must undergo digital transformation to meet these needs. The popularity of mobile payments has made customers want to make payments and financial transactions anytime and anywhere, and the traditional banking business model can no longer meet this demand. In addition, the competitive pressure from financial technology companies and Internet giants has also driven the digital transformation of banks. In order to cope with market competition, traditional banks need to enhance their competitiveness through digital transformation and provide more diversified and personalized financial services.

Policy support is a key factor in the digital transformation of commercial banks. Governments and financial regulators have actively promoted the development of digital finance and issued a series of policies and regulations to encourage commercial banks to carry out digital transformation. For example, financial regulators in many countries are actively promoting the development of financial technology, formulating relevant policies and standards, and supporting the digital transformation of the banking industry. These policy measures not only provide legal protection for the digital transformation of banks, but also provide a good environment for the innovative application of financial technology.

3.2. Ways to Achieve Digital Transformation of Commercial Banks

The digital transformation of commercial banks is mainly achieved through the construction of digital platforms, the application of data analysis and artificial intelligence, as well as the application of mobile payments and blockchain technology. First of all, the construction of digital platforms is the basis for realizing the online and intelligent banking business. By building a unified digital platform, banks can achieve comprehensive digitalization and automation of business processes, improve operational efficiency and customer experience. For example, many banks have moved traditional offline businesses online by building an integrated digital platform, realizing the onlineization of multiple services such as account management, loan applications, and payment transfers.

Secondly, data analysis and artificial intelligence applications are important means of digital transformation. Through big data analysis, banks can understand customer needs more accurately and conduct precision marketing and personalized services. Artificial intelligence technology can be applied to multiple fields such as intelligent customer service, credit assessment, and risk management to improve business processing efficiency and service levels. For example, intelligent customer service can provide customers with 24-hour uninterrupted online services through natural language processing technology to solve various problems that customers encounter during the use of banking services.

Finally, the application of mobile payment and blockchain technology is also an important part of digital transformation. The popularity of mobile payment allows customers to make payments and financial transactions anytime and anywhere, greatly facilitating their daily lives. Blockchain technology provides banks with new solutions through its decentralized, tamper-proof and transparent characteristics, especially in the fields of cross-border payment and trade financing, which improves the security and efficiency of transactions.

3.3. Impact of Digital Transformation on Banking Business

The impact of digital transformation on banking business is mainly reflected in business process optimization, customer service improvement and risk management improvement. First of all, business process optimization is the direct effect of digital transformation. Through digitalization and automation technology, banks can achieve comprehensive optimization of business processes, improve business processing efficiency and reduce operating costs. For example, online loan application and approval systems can significantly shorten loan approval time, increase loan issuance speed and improve customer satisfaction.

Secondly, improving customer service is an important goal of digital transformation. Through digital technology, banks can provide customers with more convenient and personalized services and improve customer satisfaction. For example, the application of mobile banking applications and intelligent customer service systems allows customers to obtain banking services anytime and anywhere, solving the time and location limitations of traditional banking services. Personalized financial products and services can also better meet the diverse needs of customers and improve customer loyalty.

Finally, improved risk management is an important outcome of digital transformation. Through big data analysis and artificial intelligence technology, banks can achieve a comprehensive assessment of customer credit and improve risk identification and management capabilities. For example, using big data technology, customers' behavioral data can be analyzed to identify potential credit risks, take countermeasures in advance, and reduce bad debt rates. In addition, the application of blockchain technology makes the recording and tracking of transaction data more transparent and reliable, reduces transaction risks, and improves the overall risk management level.

4. Design of Financing Model for SMEs

4.1. Basic Concept of Digital Financing Model

In the context of digitalization, the basic concept of SME financing models mainly includes credit assessment based on big data, supply chain finance based on blockchain, and online financing platforms and smart contracts. Credit assessment based on big data builds a comprehensive credit assessment model by collecting and analyzing a large amount of enterprise data, including operating conditions, market performance, and customer evaluations. This model can more accurately reflect the real credit status of SMEs, reduce information asymmetry, and improve financing efficiency. Big data technology not only improves the accuracy of credit assessment, but also helps banks discover potential high-quality customers and expand their business scope.

chain finance based on blockchain realizes real-time data sharing in all links of the supply chain by building a transparent, secure and tamper-proof transaction platform. Blockchain technology ensures the authenticity and traceability of transaction data, reduces credit risk and improves financing security. Through blockchain technology, small and medium-sized enterprises can use their position and transaction records in the supply chain to obtain more convenient and low-cost financing. This model not only improves the overall efficiency of the supply chain, but also enhances the coordination ability of all links in the supply chain, and promotes close cooperation between small and medium-sized enterprises and upstream and downstream enterprises in the supply chain.

The application of online financing platforms and smart contracts has also greatly improved financing efficiency and transparency. Online financing platforms provide a convenient financing channel for small and medium-sized enterprises through Internet technology, breaking the limitations of traditional bank physical outlets and providing enterprises with 24-hour uninterrupted financing services. Smart contracts automate and intelligentize the financing process through preset automatic execution conditions, reduce human intervention and operational errors, and ensure the fairness and transparency of transactions. This model not only simplifies the financing process, but also significantly reduces transaction costs and improves overall financing efficiency.

4.2. Specific Design of the Financing Model

In terms of specific design, the digital credit assessment system is the core of the digital financing model. The system uses big data technology to collect multi-dimensional data of enterprises, including financial data, transaction data, social media data, etc., to comprehensively assess the credit status of enterprises. Using machine learning algorithms, in-depth analysis of data is carried out to identify key factors affecting corporate credit and build a dynamic credit scoring model. The system can update the credit status of enterprises in real time, provide more accurate credit assessment results, and provide a scientific basis for banks' credit decisions.

The digital risk management system is an important means to ensure the security of financing. The system uses big data analysis and artificial intelligence technology to monitor the business risks and credit risks of enterprises in real time and predict potential risk events. Blockchain technology is used to record and track the transaction data of enterprises to ensure the authenticity and non-tamperability of the data. The system can also realize automated risk warning and processing through smart contracts, take risk control measures in a timely manner, reduce bad debt rates and financing risks, and ensure the stability and security of financing for small and medium-sized enterprises.

Digital financing channels and tools are an important way to facilitate financing. By building an online financing platform, banks can provide convenient financing services for small and medium-sized enterprises. Enterprises can submit financing applications through the platform and conduct online review and approval, which greatly shortens the financing cycle. The application of smart contracts can simplify the financing process, reduce transaction costs, and ensure the fairness and transparency of transactions. Using mobile payment and electronic signature technology, enterprises can conduct financing operations anytime and anywhere, which improves the convenience and efficiency of financing and enables small and medium-sized enterprises to obtain the required funds more quickly.

4.3. Implementation Path of the Financing Model

In order to achieve the smooth implementation of the digital financing model, commercial banks need to transform their internal processes. First, banks need to optimize existing business processes, integrate big data, artificial intelligence and blockchain technology, and achieve comprehensive digitalization and automation of their business. Second, banks need to establish a dedicated digital team responsible for the research and development and application of digital technology to enhance the bank's technical and innovation capabilities. In addition, banks also need to strengthen digital training for employees and improve their digital literacy and service capabilities to ensure the smooth implementation and promotion of the digital financing model, thereby comprehensively improving the bank's operational efficiency and service quality.

Cross-industry cooperation and ecosystem construction are also important paths to implement digital financing models. Banks need to establish close cooperative relationships with technology companies, Internet platforms, supply chain companies, etc., and jointly build an open digital ecosystem. By cooperating with all parties, banks can obtain more corporate data and improve the accuracy of credit assessment and risk management. At the same time, banks can also leverage the technological advantages of their partners to accelerate the application and promotion of digital technologies, improve the efficiency and quality of financing services, promote the innovation and development of financing models for small and medium-sized enterprises, and form a mutually beneficial and win-win ecosystem.

Policy support and optimization of the regulatory framework are key guarantees for the implementation of digital financing models. The government and financial regulatory agencies need to introduce relevant policies to encourage and support the digital transformation of commercial banks. At the same time, a scientific regulatory framework needs to be formulated to ensure that the digital financing model is legal, compliant, and risk-controlled. Through policy support and regulatory optimization, a good external environment can be provided for the implementation of digital financing models, promoting the innovation and development of financing services for small and medium-sized enterprises, ensuring that small and medium-sized enterprises can obtain stable financial support in the digital economy era, and promoting the sustained and healthy development of the economy.

5. Case Analysis

5.1. Analysis of Successful Cases at Home and Abroad

In China, as a model of digital transformation of commercial banks, China Merchants Bank has achieved remarkable results in its digital strategy. By building an integrated digital platform and integrating online and offline resources, China Merchants Bank has launched a number of digital services such as smart investment advisors and mobile banking. In terms of credit assessment, China Merchants Bank uses big data and artificial intelligence technology to conduct in-depth analysis of customer behavior data, improving the accuracy of credit risk assessment and loan approval efficiency. In addition, China Merchants Bank has also promoted the development of supply chain finance through blockchain technology and built a transparent and secure financing environment. These digital initiatives have not only improved the bank's operating efficiency and service quality, but also greatly improved the financing experience of small and medium-sized enterprises.

Abroad, Spain's BBVA Bank is one of the pioneers of digital transformation. Through its digital strategy, BBVA Bank has achieved comprehensive digitalization and automation of its business processes. The bank has launched an AI-based intelligent customer service system that can quickly respond to customer needs and improve customer satisfaction. At the same time, BBVA Bank also uses blockchain technology to simplify cross-border payment processes and reduce transaction costs and time. In addition, BBVA Bank has developed an advanced online financing platform, through which enterprises can apply for financing, approve and lend, greatly improving financing efficiency. BBVA Bank's digital transformation experience provides valuable reference for other banks.

5.2. Lessons from the Case

Through the analysis of successful cases at home and abroad, it can be seen that the actual effect of digital transformation on the financing of small and medium-sized enterprises is significant. First, digital technology improves the accuracy and efficiency of credit assessment and reduces the risks brought by information asymmetry. The application of big data and artificial intelligence technology enables banks to assess the credit status of small and medium-sized enterprises more comprehensively and accurately, reduces loan approval time, and improves financing efficiency. Secondly, the application of blockchain technology ensures the authenticity and transparency of transaction data, reduces financing risks, and improves financing security. The application of these technologies enables small and medium-sized enterprises to obtain the required funds more conveniently and quickly, promoting their development and innovation.

The successful experiences and practices that can be learned from are mainly reflected in the following aspects. First, banks should actively promote the construction of digital platforms, integrate online and offline resources, and provide one-stop financial services. Second, they should strengthen cooperation with technology companies, leverage their technological advantages, and accelerate the application and promotion of digital technologies. Third, banks need to focus on customer experience and improve customer satisfaction through intelligent customer service and personalized services. In addition, the government and financial regulators should introduce relevant policies to encourage and support the digital transformation of commercial banks and provide a good external environment. By learning from these successful experiences, other banks can better promote digital transformation and improve the efficiency and quality of financing services for small and medium-sized enterprises.

6. Conclusion and Suggestions

6.1. Research Conclusions

Through the study of the digital transformation of commercial banks and its impact on SME financing, the following conclusions can be drawn. First, digital transformation has significantly improved the operational efficiency and service quality of commercial banks. Through the application of technologies such as big data, artificial intelligence and blockchain, banks can conduct credit assessment and risk management more accurately, thereby reducing information asymmetry and credit risk, and improving loan approval speed and financing efficiency. Secondly, the application of digital technology enables SMEs to obtain financing support more conveniently and improves their financing environment. The credit assessment system based on big data, supply chain finance based on blockchain, and the use of online financing platforms and smart contracts have formed innovative financing models that not only improve the financing efficiency of SMEs, but also reduce financing costs.

The innovation and advantage of the new financing model lies in its technology-driven and systematic design. Big data technology makes credit assessment more comprehensive and dynamic, artificial intelligence technology improves the intelligence level of risk management, and blockchain technology ensures the transparency and security of transaction data. Through the integrated application of these technologies, an efficient, safe and transparent financing model has been formed. These innovative models not only improve the service capabilities and market competitiveness of banks, but also provide more flexible and diversified financing channels for small and medium-sized enterprises, promoting the sustainable development and innovation of small and medium-sized enterprises.

6.2. Policy Recommendations

To promote the development of financial technology, the government should increase its support for financial technology companies and encourage technological innovation and application. Specific measures include providing research and development funding, establishing financial technology innovation pilot zones, and encouraging cooperation between financial institutions and technology companies. At the same time, the training of financial technology talents should be strengthened to improve the overall level of financial technology. These measures can promote the development of financial technology, promote the digital transformation of the banking industry, and improve the overall level of financial services.

Optimizing the regulatory environment is also an important guarantee for promoting the digital transformation of commercial banks. The government and financial regulators should formulate scientific and reasonable regulatory policies to prevent financial risks and encourage innovation. Specific suggestions include formulating a special regulatory framework for financial technology to ensure its legal and compliant operation; at the same time, simplifying the approval process, improving regulatory transparency, and creating a good innovation environment. In addition, regulators should strengthen communication and cooperation with financial institutions, keep abreast of industry trends and needs, and provide more flexible and adaptive regulatory services.

Finally, the construction of the financing service system for SMEs should be strengthened. The government should introduce policies to encourage financial institutions to increase their financing support for SMEs and provide more financial products and services. Specific measures include setting up a special fund for SME financing, providing financing guarantees and risk compensation, simplifying the loan approval process, and lowering loan interest rates. At the same time, financial knowledge training for SMEs should be strengthened to improve their financing capabilities and risk management levels. Through these measures, the financing

environment for SMEs can be improved, and their healthy development and innovation capabilities can be promoted.

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